

APPLICATION FOR PATENT

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Title of the Invention: DRAWING MANAGEMENT
DEVICE

Number of Claim(s) for a Patent: 1

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List of the annexed documents:

- (1) Specification 1 copy
- (2) Drawings 1 copy
- (3) Power of Attorney 1 copy
- (4) Duplicate of Patent Application Form 1 copy

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SPECIFICATION

1. Title of the Invention

5 DRAWING MANAGEMENT DEVICE

2. Scope of Claims for a Patent

1. A drawing management device characterized by
including first storing means for dividing a facility
10 drawing of an overall facility into plural parts at each
management area unit and storing said divided facility
drawing parts in the form of digitized information
together with its attribute information; a drawing input
device for inputting said divided facility drawing
15 information to be stored in said first storing means; an
data input device for inputting said attribute information
to be stored in said first storing means; second storing
means for temporarily storing said required divided
facility drawing information and its attribute information
20 stored in said first storing means or said divided
facility drawing information to be given by said drawing
input device; a display device for displaying parts or all
of said divided facility drawing information storing in
said second storing means and its attribute information;
25 manipulation input means for inputting location
coordinates of said divided facility drawing to be
temporarily put from said first storing means to said
second storing means, location coordinates to said divided

facility drawing to be displayed on said display device, and drawing modifying information to be used for modifying said divided facility drawing to be displayed on said display device; a digital processing device for 5 controlling each of those means and devices, and display means for displaying an object to be requested by a user on said display device by specifying a time limiting condition or target objects.

10 3. Detailed Description of the Invention

[Industrial Field of Utilization]

The present invention relates to a drawing management device for managing the drawings of facilities such as a pipe laying system of a water and gas supply and 15 a wiring system for electric power and telephone in the form of their digitized information.

[Prior Art]

Conventionally, the state of facilities such as pipe laying for a water and gas supply, and wiring for 20 electric power and telephone has been managed using the drawing drafted on a sheet of paper or polyester film. In this case, a change in the facilities requires to modify the drawing. The work of modifying the drawing must be performed by man power so that long time and much labor 25 are required and also the possibility of erroneously modifying is relatively strong. In order to solve such a problem, it has been proposed to manage the facility drawing in the form of its digitized information. For

example, as disclosed in JP-A-63-254565, the management is performed by displaying the many facility drawings (e.g. topography drawings, system drawings and symbol drawings) stored in a file device on a display device to monitor them. The work for modifying the drawings is also made for the drawings displayed on the display device.

[Problem to be solved by the Invention]

In displaying large scale drawing data including qualifying lines, the processing therefor is executed at a very low speed. This is because even if only a part of the drawing is required, all the data including minute and detailed character information which is difficult to recognize are displayed. Therefore, the above prior art is poor in its usability and efficiency as a system.

The present invention has been accomplished in order to cope with the above defect of the prior art, and intends to provide a drawing management device that can surely attain a user's will, i.e. has a function of displaying the object required by a user swiftly and exactly.

[Means for Solving Problem]

In order to attain the above object, a certain limit is given to the drawing time and priorities are automatically allotted to display objects located at several levels so that the necessary and minimum information can be displayed within a limited time.

[Operation]

The priorities of drawing data relative to the

facility for water supply are automatically allotted at three to five levels. An operator updates the priority in sequence from the history information with a changed display level thereby to provide a desired drawing swiftly.

5 [Embodiments]

Referring now to the drawings, an explanation will be given of one embodiment of the present invention.

Fig. 2 shows the basic arrangement of a drawing management device according to an embodiment of the
10 present invention.

In Fig. 2, facility drawing data are stored in a file device 203. The facility drawing data include graphic or figure data of topography, tube paths, etc., and attribute data such as the name of a town, the name of an
15 individual, the diameter of a tube, the kind of the tube expressed by characters and numerical values relative to the graphic. The graphic data stored are supplied from a drawing input device 204 in such a manner that the drawing drafted on a sheet of paper is scanned at regular
20 intervals to be toned in accordance with the light and shade of the read data so that the digital image thus obtained provide encoded data. The facility drawing is composed of a plurality of drawings as shown in Fig. 3(a) which are individually separated to provide graphic data
25 files. The graphic data are expressed on rectangular coordinates as shown in Fig. 3(b). The lengths in the X and Y direction are determined by the size of the drawing concerned. These graphic data are expressed in such a way

that they are separated in plural levels of road data, home corner data, and tube path data as shown in Figs. 4(b) to 4(d). The data located at these levels are superposed as required to provide the graphic data as shown in Fig. 4(a). On the other hand, the attribute data are supplied to the file device 203 from a data inputting device 208 which collectively supplies data from a keyboard 206 or a floppy disk. An operator manipulates a mouse 207 to display the drawing on a display device (CRT) 205 as follows. First, the operator manipulates the mouse 207 to move a cursor CU to one of icons for selecting functions displayed on the CRT screen so that the function intended is specified. If the icon for 'drawing retrieval' is specified, a central processing unit (CPU) 201 searches the drawing data concerned (composed of the graphic data and their attribute data) from the file device and temporarily stores the data in a main memory 202. The main memory 202 serves to store the programs for executing the processings such as search and edition of the drawing data and the drawing data being processed. The drawing data temporarily stored in the main memory 202 are edited by the CPU 201 in accordance with the valid display coordinate that is a display region of the CRT 205, and thereafter the edited data are displayed on the CRT 205. The operator can recognize the contents of a desired or objective drawing from the displayed image. Further, in order to recognize the details of the drawing, the image is displayed so as to be partially enlarged. To this end,

the cursor CU is moved using the mouse 207 to specify any square region within the CRT display region in terms of ends of a diagonal line so that a part of the drawing is enlarged or reduced at an arbitrary magnification.

- 5 Actually, a part of the drawing data concerned stored in the main memory 202 are edited in an enlarged or reduced way through the CPU 201, and the drawing data thus edited are displayed on the CRT 205.

An explanation will be made on the level display
10 with priorities that permits to be displayed within a predetermined time.

Fig. 1 shows a configuration diagram of an essential part of one embodiment of the present invention. The display screen 101 is composed of an icon region 102
15 where the mouse is manipulated to select the function of retrieval or searching and displaying a desired drawing, and a drawing displaying region 103 where the drawing is displayed. The mouse 207 is used to select the function from the icon region 102 and specify the location of the
20 drawing to be displayed on the drawing displaying region 103. The keyboard 206 is used to set the condition of searching a drawing. The data inputted from the keyboard 206 and the mouse 207 are taken in an operation input unit 111 in the CPU 201. The drawing data are previously stored
25 in the file device 203.

An explanation will be given of the relationship between the function of each of functional units within the CPU 201, and an operation or manipulation and display.

A desired drawing is retrieved or searched using an index drawing, drawing number, etc. and thereafter displayed on the display device. The operation of the CPU 201 in such a display processing process will be explained 5 below. First, using the mouse 207, the item "drawing retrieval" is selected on the icon region 102 for mouse manipulation. This selective designation is inputted to a manipulation input section 104 thereby to activate a priority display control section 105. The priority display 10 control section 105 directs a graphic retrieval section 106 to retrieve the desired drawing. Further, when the retrieval section 106 retrieves the drawing data, the priority processing section 107 is started. The data amount to be displayed is calculated within a display time 15 specified before this function by the user and then to pass the data amount to the priority processing section 107. The graphic retrieval section 106 serves to retrieve the drawing data from the drawing file stored in the file device 203 in accordance with the desired drawing number 20 and put it in a main memory 202. On termination of searching all the drawing data, the drawing retrieval section serves to send a signal to the priority processing section 107. The priority processing section 107 serves to read the drawing data from the main memory 202 and then to 25 send the hierarchical figure represented on the display priority table and the data amount to be displayed within a specified time to a display editing section 110 in sequence. The display editing section 110 serves to depict

a drawing on a drawing display area 103 on the basis of the drawing data.

Fig. 5 shows the display priority table in which a level number of the hierarchy and its priority are stored. Herein, the priority is higher as its number is made smaller. It may be reversed.

[Effects of the Invention]

As described above, the present invention is capable of reducing the display time of a drawing as well as automatically creating a target drawing only by the user's indication to the target drawing. Therefore, the present invention makes it possible to swiftly display the target drawing intended by the user.

15 4. Brief Description of Drawings

Fig. 1 is a block diagram showing an essential part of one embodiment of the present invention. Fig. 2 is an overall block diagram showing an embodiment of the present invention. Fig. 3 is a view showing relation between the drawing arrangement and the drawing coordinates stored in a file device. Fig. 4 is a view showing a hierarchical arrangement of the drawing data. Fig. 5 is a view showing a display priority table.

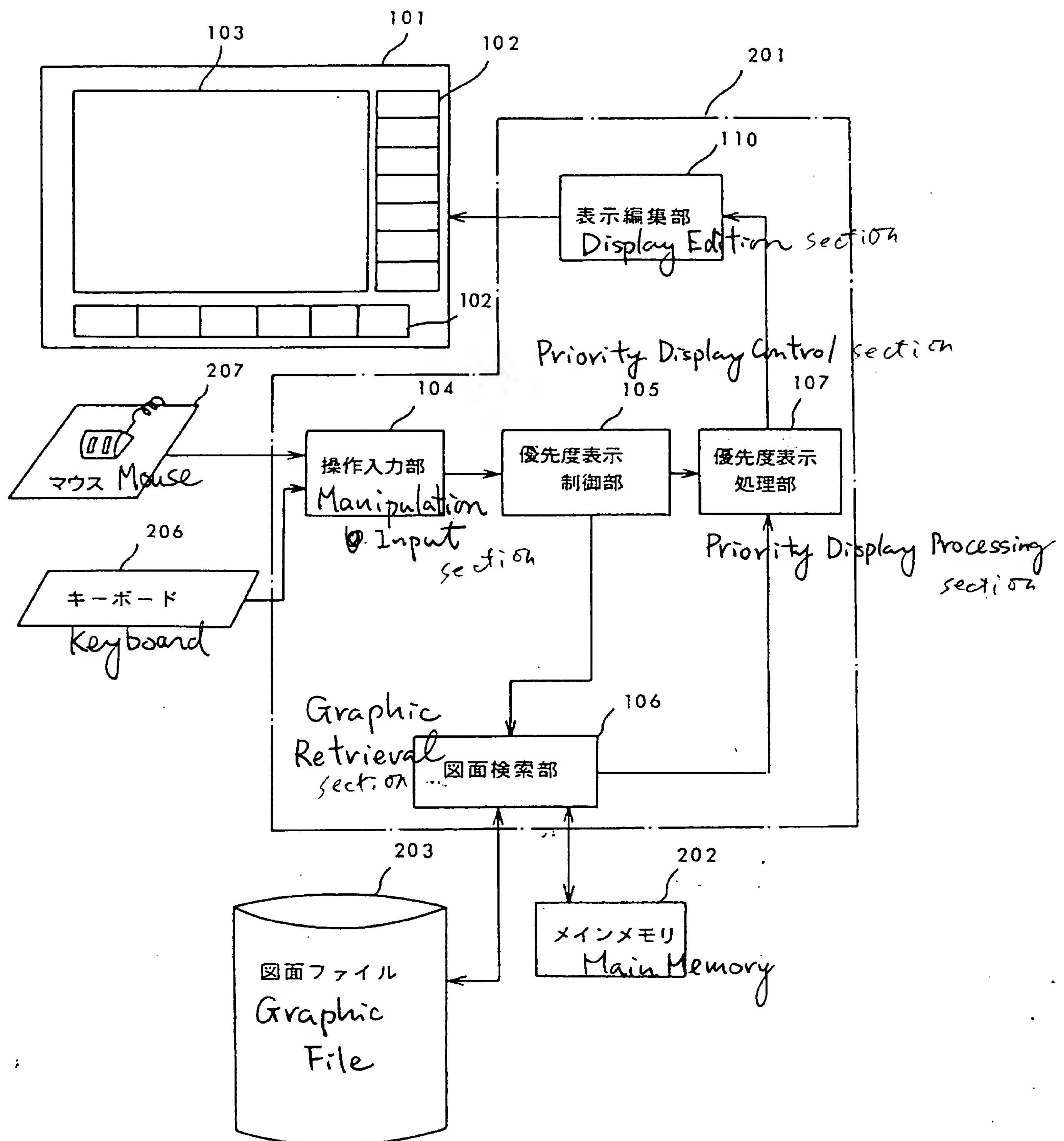
25 101... Display Screen, 102... Mouse-operated Icon Area, 103... Drawing Display Area, 104... Manipulation Input Unit, 105... Priority Display Control Section, 106... Graphic Retrieval Section, 107...

Priority Display Processing Section, 110... Display
Edition Section, 201... CPU, 202... Main Memory, 203...
File Device, 204... Drawing Input Device, 205... CPT,
206... Keyboard, 207... Mouse, 208... Data Input Device

5

Agent: Patent Attorney, Katsuo Ogawa

第 1 図 Fig. 1

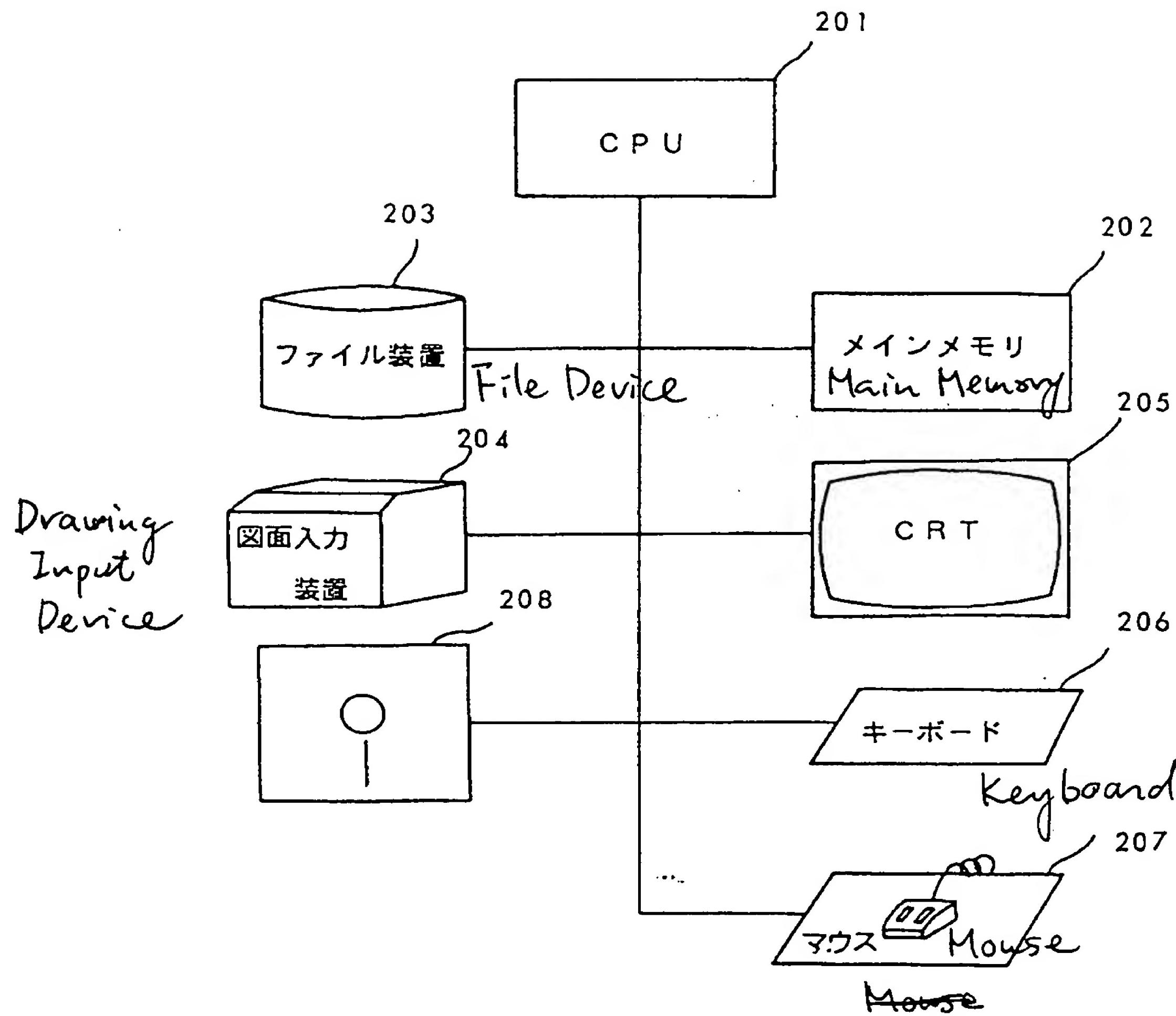


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Fig. 2

第 2 図



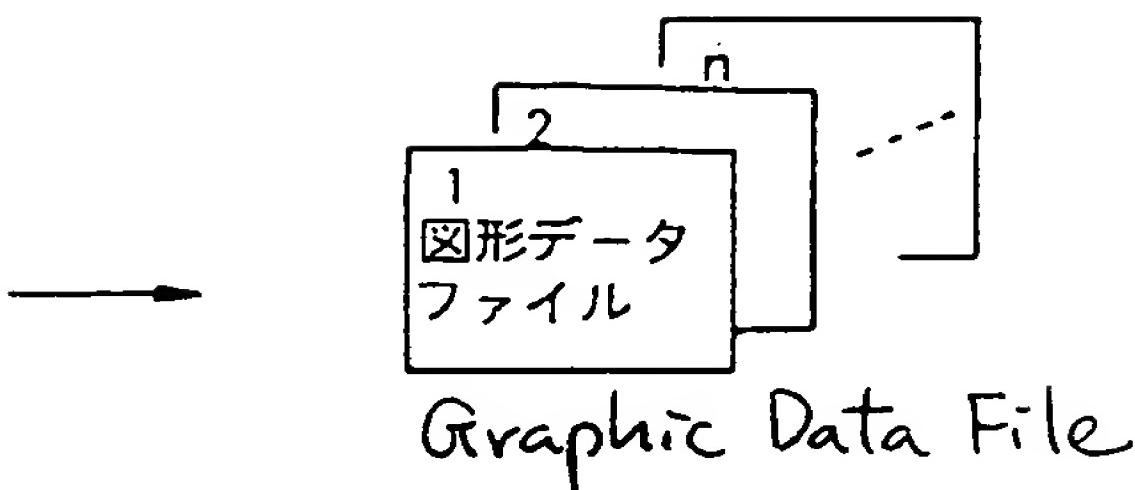
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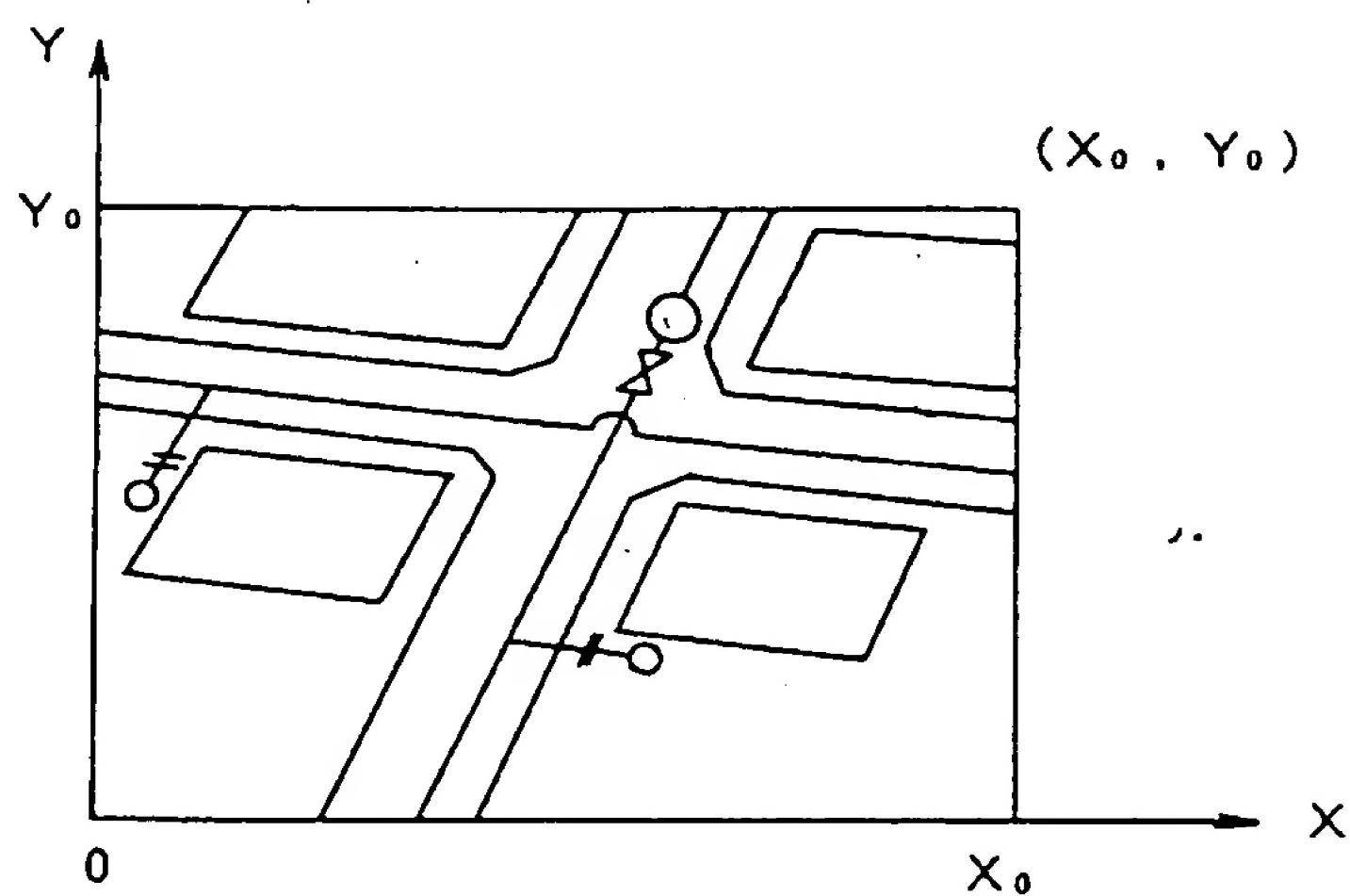
第 3 図 Fig. 3

(a) 図面構成
Drawing
Arrangement

1	2	3	4	5
6	7	8	---	
			---	n



(b) 図形座標 Graphic Coordinates

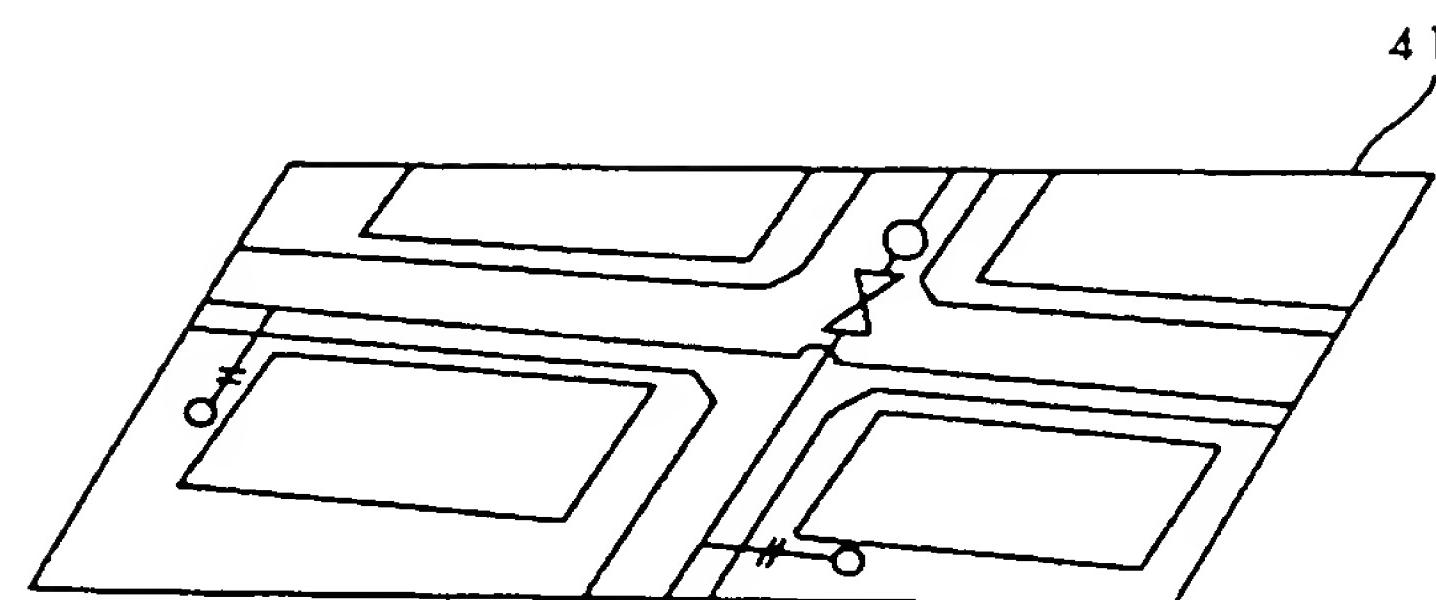


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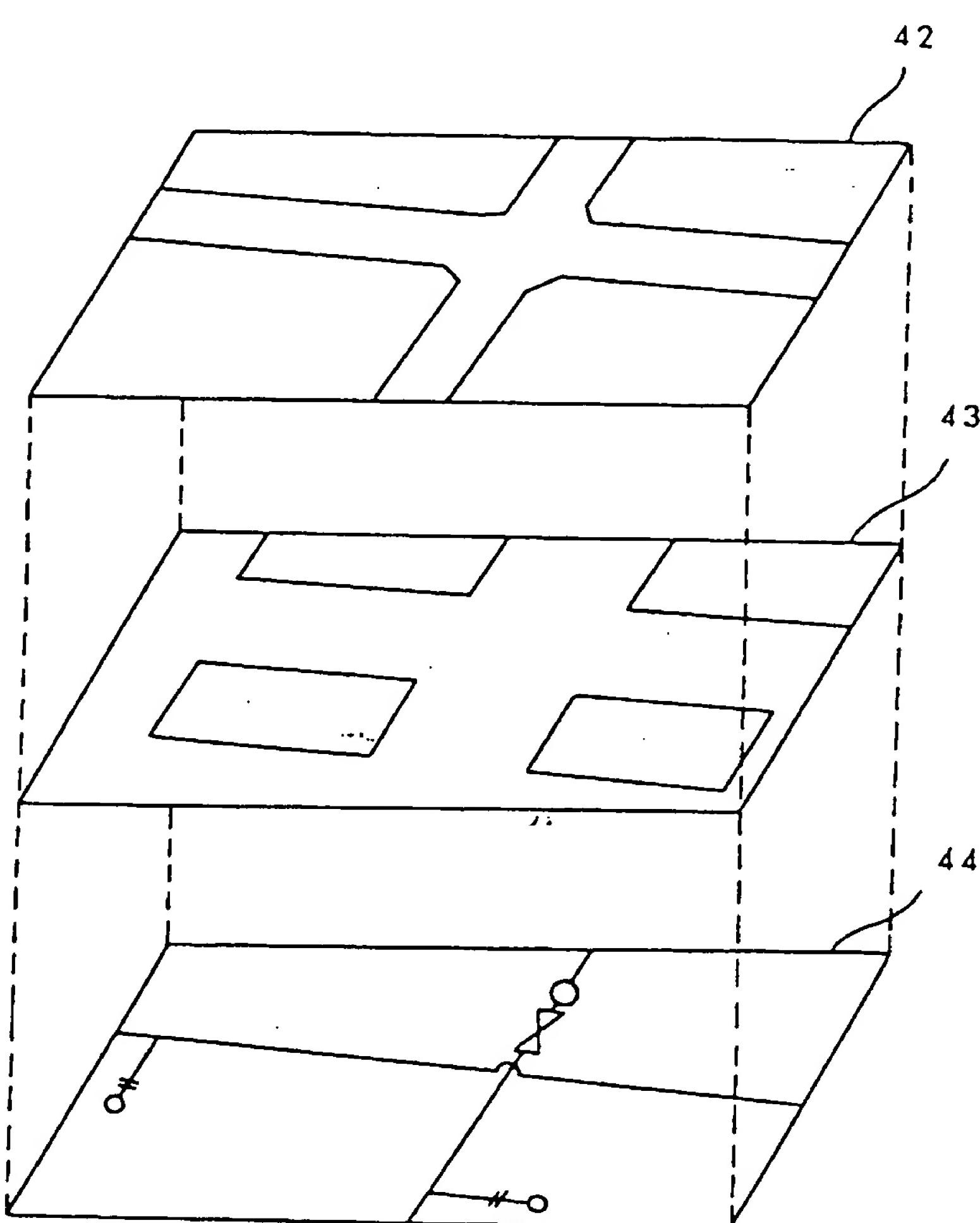
Fig. 4
第 4 図

(a)



(b) 層 1

Level 1



(c) 層 2

Level 2

(d) 層 3

Level 3

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Fig.5

第 5 図

Display Priority Table
表示優先度テーブル

層番号 Level Number	優先度 Priority
10101	1
10102	3
10103	1
⋮	⋮
n	2

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